

Investigation

2

Combining Expressions

In the last investigation, you found several ways to write equivalent expressions to describe a quantity. You also learned several ways to show that two expressions are equivalent. We will continue to answer the questions:

- Are the expressions equivalent? Why?
- What information does each equivalent expression represent?

We will also look at ways to create new expressions and to answer the question:

- What are the advantages and disadvantages of using one equation rather than two or more equations to represent a situation?

2.1

Walking Together

In *Moving Straight Ahead*, Leanne, Gilberto, and Alana enter a walkathon as a team. This means that each person will walk the same number of kilometers. The walkathon organizers offer a prize to the three-person team that raises the most money.

- Leanne has walkathon pledges from 16 sponsors. All of her sponsors pledge \$10 regardless of how far she walks.
- Gilberto has pledges from 7 sponsors. Each sponsor pledges \$2 for each kilometer he walks.
- Alana has pledges from 11 sponsors. Each sponsor pledges \$5 plus \$0.50 for each kilometer she walks.



Problem 2.1 Adding Expressions

- A. 1.** Write equations to represent the money M that each student will raise for walking x kilometers.
- $M_{\text{Leanne}} = \blacksquare$
 - $M_{\text{Gilberto}} = \blacksquare$
 - $M_{\text{Alana}} = \blacksquare$
- 2.** Write an equation for the total money M_{total} raised by the three-person team for walking x kilometers.
- B. 1.** Write an expression that is equivalent to the expression for the total amount in Question A, part (2). Explain why it is equivalent.
- 2.** What information does this new expression represent about the situation?
- 3.** Suppose each person walks 10 kilometers. Explain which expression(s) you would use to calculate the total amount of money raised.
- C.** Are the relationships between kilometers walked and money raised linear, exponential, quadratic, or none of these? Explain.

ACE Homework starts on page 28.

2.2 Predicting Profit

The manager of the Water City amusement park uses data collected over the past several years to write equations that will help her make predictions about the daily operations of the park.

The daily concession-stand profit in dollars P depends on the number of visitors V . The manager writes the equation below to model this relationship.

$$P = 2.50V - 500$$

She uses the equation below to predict the number of visitors V based on the probability of rain R .

$$V = 600 - 500R$$

- What information might each of the numbers in the equations represent?